If your Exhibit A

Project Summary & Scope of Work

☐ Contract x Grant

Project Summary/Abstract

Briefly describe the long-term objectives for achieving the stated goals of the project.

Improved diagnostics, predictors and control for Environmental Bud Failure (EBF) and Noninfectious Bud-Failure (NBF)

The long-term objective of this research is to better understand both the initial trigger and subsequent developmental response of Environmental Bud Failure (EBF) and how it compares with Noninfectious Bud Failure (NBF) in almond. This information is required to develop more effective models for these disorders that could then be used as diagnostics, predictors of future occurrence, and possibly segues for eventual control and/or genetic rehabilitation.

Because axillary vegetative buds and epicormic buds differ greatly in their vulnerability to both EBF and NBF even when in close proximity on the same shoot, a better understanding of their differences in origin, dormancy, induction, and subsequent growth patterns would help define differences in the initial triggering and subsequent plant responses for EBF versus NBF. In addition, because growers often resort to severe pruning to push epicormic 'watersprouts' when spring bud-failure expression is severe in young trees, a better understanding of epicormic bud origins, viability and inducibility for growth would allow better decision-making when faced with 'prune hard versus replant' decisions.

If Third-Party Confidential Information is to be provided by the State:

☐ Performance of the Scope of Work is anticipated to involve use of third-party Confidential Information and is subject to the terms of this Agreement; ***OR***

☐ A separate CNDA between the University and third-party is required by the third-party and is incorporated in this Agreement as Exhibit A7.

Scope of Work

Describe the goals and specific objectives of the proposed project and summarize the expected outcomes. If applicable, describe the overall strategy, methodology, and analyses to be used. Include how the data will be collected, analyzed, and interpreted as well as any resource sharing plans as appropriate. Discuss potential problems, alternative strategies, and benchmarks for success anticipated to achieve the goals and objectives.

The failure or significant delay of vegetative bud development and growth weakens tree productivity in the current year through the decreased availability of new shoots and leaves for photosynthesis and in the following years through decreased flower-bearing wood and so potential yields. Bud 'pushing' failures have a range of possible causes, including virus and bacterial infections, nutrient deficiencies and weak winter vernalization (10). Genetic bud-failures are those associated with specific genotypes (varieties) including Noninfectious Bud Failure (NBF) in Nonpareil, Carmel and others, and Environmental Bud Failure (EBF) in Monterey, Bennett and others. NBF and EBF both result in bud-failures but differ in their induction, developmental-timelines and ultimate cause of collapse. Understanding these differences is important for both diagnosis and management.

Objectives and methods:

1. Determine time of initial failure (induction) for EBF in Monterey, Bennett, and others using meristem leaf-primordia development during dormancy as a timeline.
    a. Compared timing of this first indicator of failure with NBF patterns.
    b. Determine whether the site of subsequent vegetative bud-pushing is axillary or epicormic
    c. Identify a rapid diagnostic for epicormic viability (for EBF & NBF)
        i. Meristem morphology under dissecting microscope.
        ii. Vascular discoloration
            -determine which appears to fail first, vascular or meristem.

2. Develop dependable procedures for epicormic meristem propagation
    a. Epicormic propagation by in-field 'pushing'
        i. Determine seasonal response following complete branch pruning
        ii. Determine seasonal response following partial branch girdling
    b. Epicormic tissue-culture
        i. Optimize tissue culture conditions for excised epicormic meristems
            - Determine seasonal response for successful culturing
        ii. Develop procedures for micrograft been on to seedling rootstock

Background.

Genetic control of Noninfectious Bud Failure has been demonstrated in crossing studies with almond and peach (10, 14). Noninfectious bud-failure does not result from a genetic change but rather a change in the state of a hypothetical 'dormancy' gene; in effect, this gene is turned-off at the wrong time and this change is irreversible once a certain genetic 'age' is achieved (1, 8, 14). Results from 2020-21 summer dormant bud-pushing studies support our preliminary hypothesis that this gene also functions in a hypothesized summer dormancy in almond, and this is when initial induction/triggering of the disorder may occur. [A critical diagnostic for NBF is that vegetative buds are already dead (necrotic and brown at the vascular core) going into winter dormancy in the fall, further indicating that the induction occurred during a previous growing season]. Mechanisms for controlling gene action without changing gene identity are known as epigenetic mechanisms and include changes in gene methylation (11, 12), chromosome (telomere) structure (13), micro-RNA composition as well as several still poorly understood processes (2). Results from ongoing Almond Board of California (ABC) funded collaborative OSU studies also support earlier findings (8) that methylation changes are associated (whether causative or not) with the NBF genetic-aging, and so can be used for more accurate diagnostics as well as better management. Recent OSU research collaborations have identified methylation events in propagation sources that are strongly associated with (and so possible predictors of) high probability of NBF expression in trees propagated from those sources (11, 12). In addition, we are pursuing more general and so more readily diagnosed methylation patterns associated with general aging that could then be directly used to better manage aging in FPS clones of Carmel and possibly Nonpareil, and so indirectly suppress their advancement to NBF expression. [FPS foundation trees are heavily pruned to selectively push dormant (and so reduced epigenetic-age) epicormic buds rather than axillary shoot buds where genetic ageing

continues to advance in resulting propagation wood (1, 9). However, with the current intensity of FPS pruning it is often difficult to determine whether the bud pushed is a true epicormic bud rather than a more basal axillary shoot bud. Molecular markers based on general methylation status (2, 8, 11, 12) should be able to rapidly discriminate these two types of buds with eventual marker deployment similar to molecular fingerprinting/virus-screening currently routinely employed at FPS]. We will be Google continue to screen for such useful methylation markers and to further verify the origins (current season axillary or dormant epicormic bud) through tissue-sectioning to identify vascular trace and so differentiate bud development patterns and timelines [Objective-1c]. This plant tissue analysis could also help us identify the tissue where BF is initially triggered (leaf, bark, bud, etc.) for screening useful molecular markers.

In contrast, the greater site, source and year-to-year variability in Environmental Bud Failure (EBF) suggests that while it is associated with certain highly susceptible genotypes (varieties) it is strongly affected/triggered by environmental factors such as diseases and/or other stresses during the previous growing season and climate conditions during dormancy. Environmental bud-failure is activated at some time between fall dormancy and bud-pushing the following spring, but the specific time (and so mechanism) of failure has not been determined partly because of a lack of useful developmental milestones for bud development during dormancy. Research in 2020 and 2021 has shown that the number of leaf primordia in dormant Nonpareil as well as Monterey buds continue to show a fairly uniform rate of increase throughout dormancy and that this internal bud-growth pattern can be used to establish a developmental timeline for normal dormant bud development as well as providing more specific estimates for the time of EBF bud collapse [Objectives 1-a & b]. As in 2020, the increase in number of 2021 leaf primordial was relatively uniform among and between varieties and among shoots from different parts of the trees early in the dormant season.

While it is expected that the deeper dormancy of epicormic buds would show different and much reduced leaf primordia development patterns, the status of these epicormic buds is still critical to grower/nursery tree management decisions when EBF occurs (particularly on young trees) because it will provide important information in determining whether the effects of EBF can be effectively managed by pruning-back affected shoots to push any available epicormic shoots (waterspouts). However, little is currently known concerning the developmental/growth patterns of epicormic buds, including how readily they can be pushed during different seasons of growth and dormancy. Objective 2-a will provide this information through a seasonal branch pruning study to push nearby epicormic buds. Meristem characteristics prior to pushing will be recorded [Objective 1c] to identify any conditions which can be used as predictors of epicormic bud viability (ability to push). Parallel with this seasonal study, epicormic buds will be placed into tissue culture using the FPS micro-meristem culture procedures developed for almond so that conditions for optimizing tissue culture 'pushing' will be optimized for epicormic buds. Alternatively, we will experiment with micrografting excised epicormic buds onto sterile, cultured seedling rootstocks [objective 2B]. Resulting knowledge in epicormic viability (successful vegetative shoot pushing) will be useful for EBF field management and may be particularly useful for propagating low-Noninfectious Bud Failure clonal sources, particularly when propagation is attempted off-season.

References.

1. Kester, D.E., K.A. Shackel, W.C. Micke, M. Viveros, and T.M. Gradziel. (2004). Noninfectious bud failure in 'Carmel' almond: I. Pattern of development in vegetative progeny trees. J. Amer. Soc. Hort. Sci. 129(2):244-249.

2. Fernandez i Marti, A., Gradziel, T. M. and Socias i Company, R. 2014. Methylation of the Sf locus in almond is associated with S-RNase loss of function. Plant Molecular Biology 86: 681-689.

3. Akagi, T, Hanada,T, Yaegaki, H, Gradziel, T, and Ryutaro Tao, R. 2016. Genome-wide view of genetic diversity reveals paths of selection and cultivar differentiation in peach domestication. DNA Research,1–12.

4. Hanada, T; A. Watari, T. Kibe, H. Yamane, A. Wünsch, T.M. Gradziel, Y. Sasabe, H. Yaegaki, M. Yamaguchi and R. Tao. 2017. Two Novel Self-compatible S Haplotypes in Peach (Prunus persica). J. Japan. Soc. Hort. Sci. 83:203-213. DOI 2503/jjshs1.CH-099.

5. Su, M. N., Venkatachalam, M., Gradziel, T. M., Liu, C. Q., Zhang, Y., Roux, K. H. and Sathe, S. K. 2017. Application of mouse monoclonal antibody (mAb) 4C10-based enzyme-linked immunosorbent assay (ELISA) for amandin detection in almond (Prunus dulcis L.) genotypes and hybrids. LWT - Food Science and Technology 60: 535-543. 60 (2015) 535e543.

6. Nassar, N.M.A. , N. N. Bomfim Fernandes, , D. Y. Hashimoto Freitas. and T. M. Gradziel Interspecific Periclinal Chimeras as a Strategy for Cultivar Development. 2017. In J. Janick (ed.) Plant Breeding Reviews. 40:235-263. ISBN: 978-1-119-27968-6

7. Jonathan Fresnedo-Ramírez, Thomas R. Famula and Thomas M. Gradziel. 2017. Application of a Bayesian ordinal animal model for the estimation of breeding values for the resistance to Monilinia fruticola (G.Winter) Honey in progenies of peach [Prunus persica (L.) Batsch]. Breeding Science Preview doi:10.1270/jsbbs.16027

8. Fresnedo-Ramírez, J., Chan, H. M., Parfitt, D. E., Crisosto, C. H., & Gradziel, T. M. 2017. Genome-wide DNA-(de)methylation is associated with Noninfectious Bud-failure exhibition in Almond (Prunus dulcis [Mill.] D.A.Webb). Scientific Reports, 7. doi:10.1038/srep42686.

9. Gradziel T, B. Lampinen and J.E. Preece. (2019). Propagation from Basal Epicormic Meristems Remediates an Aging-Related Disorder in Almond Clones. Horticulturae 2019, 5(2), 28; https://doi.org/10.3390/horticulturae5020028

10. Gradziel, t. and J. Fresnedo-Ramírez. (2019). Noninfectious Bud-failure As a Model for Studying Age Related Genetic Disorders in Long-Lived Perennial Plants. Journal of the American Pomological Society 73(4): 240-253 2019.

11. D'Amico-Willman, K. M., Niederhuth, C. E., Willman, M. R., Gradziel, T. M., Ouma, W. Z., Meulia, T., et al. (2021). Integrated analysis of the methylome and transcriptome of twin almonds (Prunus dulcis [Mill.] D.A.Webb) reveals genomic features associated with non-infectious bud failure. doi: https://www.doi.org/10.1101/2021.02.08.430330. D'Amico-Willman, K.M. , Gina M. Sideli, Brian J. Allen, Elizabeth S. Anderson, Thomas M. Gradziel, Jonathan Fresnedo-Ramírez. Identification of putative markers of noninfectious bud failure in almond (Prunus dulcis [Mill] D.A. Webb) through genome wide DNA methylation profiling and gene expression analysis in an almond □ peach hybrid population. Frontiers Front. Plant Sci. 13:804145. doi: 10.3389/fpls.2022.804145.

12. D'Amico-Willman,K.M. Chad E. Niederhuth, Elizabeth S. Anderson, Thomas M. Gradziel, Jonathan Fresnedo Ramírez. 2021. Hypermethylation is associated with increased age in almond (Prunus dulcis [Mill.] D.A. Webb) accessions. bioRxiv 2021.05.02.442365; doi: https://doi.org/10.1101/2021.05.02.442365

13. D'Amico-Willman, K.M.; Anderson, E.S.; Gradziel, T.M.; Fresnedo-Ramírez, J. Relative Telomere Length and Telomerase Reverse Transcriptase (TERT) Expression Are Associated with Age in Almond (Prunus dulcis [Mill.] D.A.Webb). Plants 2021, 10, 189. https://doi.org/10.3390/plants10020189

14. Gradziel, T.M.; Shackel, K.A. 2021. Propagation of an Epigenetic Age-Related Disorder in Almond Is Governed by Vegetative Bud Ontogeny Rather Than Chimera-Type Cell Lineage. Horticulturae, 7, 190. https://doi.org/10.3390/horticulturae7070190

Exhibit A1

SCHEDULE OF DELIVERABLES

List all items that will be delivered to the State under the proposed Scope of Work. Include all reports, including draft reports for State review, and any other deliverables, if requested by the State and agreed to by the Parties.

If use of any Deliverable is restricted or is anticipated to contain preexisting Intellectual Property with any restricted use, it will be clearly identified in Exhibit A4, Use of Preexisting Intellectual Property.

Unless otherwise directed by the State, the University Principal Investigator shall submit all deliverables to the State Contract Project Manager, identified in Exhibit A3.

Deliverable	Description	Due Date
Improved diagnostics and predictors for Environmental Bud Failure (EBF)	• Developmental timing for EBF (Monterey, Bennett) ▪ Bud leaf-primordia metric ▪ compare with NBF o subsequent bud-pushing, axillary or epicormic • Diagnostic for epicormic viability (EBF & NBF) o Meristem structure o Vascular structure ▪ First-to-fail	6/30/2023
Develop dependable procedures for Epicormic propagation	• Epicormic propagation 'pushing' o Seasonal on-tree response • Epicormic culture ▪ Virus elimination ▪ Low NBF clone sources	6/30/2023
The following Deliverables are subject to paragraph 18. Copyrights, Section B of Exhibit C		

Exhibit A2

KEY PERSONNEL

List Key Personnel as defined in the Agreement starting with the PI, by last name, first name followed by Co-PIs. Then list all other Key Personnel in alphabetical order by last name. For each individual listed include his/her name, institutional affiliation, and role on the proposed project. Use additional consecutively numbered pages as necessary.

Last Name, First Name	Institutional Affiliation	Role on Project
PI:		
Gradziel, Thomas	*Plant Sciences, UCD*	*PI*
Co-PI(s) – if applicable:		
Last name, First name	*Institutional affiliation*	*Role on the project*
Last name, First name	*Institutional affiliation*	*Role on the project*
Other Key Personnel (if applicable):		
Last name, First name	*Institutional affiliation*	*Role on the project*
Last name, First name	*Institutional affiliation*	*Role on the project*

Exhibit A3

AUTHORIZED REPRESENTATIVES AND NOTICES

The following individuals are the authorized representatives for the State and the University under this Agreement. Any official Notices issued under the terms of this Agreement shall be addressed to the Authorized Official identified below, unless otherwise identified in the Agreement.

State Agency Contacts	**University Contacts**
Agency Name: California Department of Food and Agriculture	University Name: The University of California, Davis
Contract Project Manager (Technical) Name: Katherine Filippini IAB Manager, SES Address: California Department of Food and Agriculture 1220 N Street, Room 344 Sacramento, CA 95814 Telephone: 916-654-0435 Fax: 916-651-1207 Email: Katherine.Filippini@cdfa.ca.gov	***Principal Investigator*** Name: Thomas Gradziel Professor Address: Plant Sciences University of California Davis, California, 95616 Telephone: 530-400-9292 Fax: 530-752-8502 Email: tmgradziel@ucdavis.edu Designees to certify invoices under Section 14 of Exhibit C on behalf of PI: 1. <Name>, <Title>, <EmailAddress> 2. <Name>, <Title>, <EmailAddress> 3. <Name>, <Title>, <EmailAddress>
Authorized Official (contract officer)Name: Crystal Myers, or designee Crystal Myers Branch Chief Address: California Department of Food and Agriculture, Office of Grants Administration 1220 N Street, Room 120 Sacramento, CA 95814 Telephone: 916-657-3231 Fax: NA Email: crystal.myers@cdfa.ca.gov ***Send notices to (if different):*** Name: Address: Telephone: Email:	***Authorized Official*** Name: Liu, Grace Address: Sponsored Programs University of California, Davis Davis, CA, 95618-6153 Telephone: 5307547700 Fax: 5307520333 Email: awards@ucdavis.edu ***Send notices to (if different):*** Name: Sissac, Victoria Address: Sponsored Programs University of California, Davis Davis, CA, 95618-6153 Telephone: 5307547700 Fax: 5307520333 Email: awards@ucdavis.edu

Administrative Contact Name: Kapua Kahumoku AGPA Address: California Department of Food and Agriculture 1220 N Street, Room 344 Sacramento, CA 95814 Telephone: (916) 403-6710 Fax: 916-651-1207 Email: kapua.kahumoku@cdfa.ca.gov	***Administrative Contact*** Name: Sissac, Victoria Address: Sponsored Programs University of California, Davis Davis, CA, 95618-6153 Telephone: 5307547700 Fax: 5307520333 Email: awards@ucdavis.edu
Financial Contact/Accounting Name: Kapua Kahumoku AGPA Address: California Department of Food and Agriculture 1220 N Street, Room 344 Sacramento, CA 95814 Telephone: (916) 403-6710 Fax: 916-651-1207 Email: kapua.kahumoku@cdfa.ca.gov	***Authorized Financial Contact/Invoicing*** Name: Francisco Andrade Address: Contract and Grants Accounting University of California, Davis Davis, CA, 95616 Telephone: 5307540604 Fax: 5307578721 Email: efa-invoices@ucdavis.edu Designees for invoice certification in accordance with Section 14 of Exhibit C on behalf of the Financial Contact: 1. <Name>, <Title>, <EmailAddress> 2. <Name>, <Title>, <EmailAddress> 3. <Name>, <Title>, <EmailAddress>

Exhibit A4

USE OF PREEXISTING INTELLECTUAL PROPERTY

If either Party will be using any third-party or pre-existing intellectual property (including, but not limited to data, copyrighted works, known patents, trademarks, service marks and trade secrets) "IP" with restrictions on use, then list all such IP and the nature of the restriction below. If no third-party or pre-existing IP will be used, check "none" in this section.

A. State: Preexisting IP to be provided to the University from the State or a third party for use in the performance in the Scope of Work.

xx None or ☐ List:

Owner (Name of State Agency or 3rd Party)	Description	Nature of restriction:

B. University: Restrictions in Preexisting IP included in Deliverables identified in Exhibit A1.

XX None or ☐ List:

Owner (Name of University or 3rd Party)	Description	Nature of restriction:

C. Anticipated restrictions on use of Project Data.

If the University PI anticipates that any of the Project Data generated during the performance of the Scope of Work will have a restriction on use (such as subject identifying information in a data set) then list all such anticipated restrictions below. If there are no restrictions anticipated in the Project Data, then check "None" in this section.

XX None or ☐ List:

Owner (University or 3rd Party)	Description	Nature of Restriction:

Exhibit A5

RÉSUMÉ/BIOSKETCH

Attach 2-3 page Resume/Biosketch for the PI and other Key Personnel listed in Exhibit A2.

Thomas M. Gradziel

Highest degree, institution, year of degree

Ph.D. Plant Breeding, Cornell University, Ithaca, New York, 1987

Area of expertise

Prunus genetics, genomics, epigenetics and breeding

Total number of published, peer-reviewed papers: 112

List of 10 key published papers

1. D'Amico-Willman, K. M., Niederhuth, C. E., Willman, M. R., Gradziel, T. M., Ouma, W. Z., Meulia, T., et al. (2021). Integrated analysis of the methylome and transcriptome of twin almonds (Prunus dulcis [Mill.] D.A.Webb) reveals genomic features associated with non-infectious bud failure. doi:
2. D'Amico-Willman, K.M. , Gina M. Sideli, Brian J. Allen, Elizabeth S. Anderson, Thomas M. Gradziel, Jonathan Fresnedo-Ramírez. Identification of putative markers of noninfectious bud failure in almond (Prunus dulcis [Mill] D.A. Webb) through genome wide DNA methylation profiling and gene expression analysis in an almond □ peach hybrid population. Frontiers Front. Plant Sci. 13:804145. doi: 10.3389/fpls.2022.804145.
3. D'Amico-Willman,K.M. Chad E. Niederhuth, Elizabeth S. Anderson, Thomas M. Gradziel, Jonathan Fresnedo Ramírez. 2021. Hypermethylation is associated with increased age in almond (Prunus dulcis [Mill.] D.A. Webb) accessions. bioRxiv 2021.05.02.442365; doi: https://doi.org/10.1101/2021.05.02.442365
4. D'Amico-Willman, K.M.; Anderson, E.S.; Gradziel, T.M.; Fresnedo-Ramírez, J. Relative Telomere Length and Telomerase Reverse Transcriptase (TERT) Expression Are Associated with Age in Almond (Prunus dulcis [Mill.] D.A.Webb). Plants 2021, 10, 189. https://doi.org/10.3390/plants10020189
5. Gradziel TM. (2022) utilizing wild species for rootstock development. In: C. Cole, (ed.) Genomic Designing for Biotic Stress Resistant Fruit Crops. Springer Publ. DOI : 10.1007/978-3-030-91802-6
6. Gradziel, T. M. (2022) Exotic genes for solving emerging peach production challenges. Scientia Horticulturae Volume 295, https://doi.org/10.1016/j.scienta.2021.110801.
7. Gradziel, T.M. 2020. Redomesticating Almond to Meet Emerging Food Safety Needs. Frontiers in Plant Science, Volume 11, 12 June 2020. 89/fpls.2020.00778. https://doi.org/10.33

8. Gradziel, T.M.; Shackel, K.A. 2021. Propagation of an Epigenetic Age-Related Disorder in Almond Is Governed by Vegetative Bud Ontogeny Rather Than Chimera-Type Cell Lineage. Horticulturae, 7, 190. https://doi.org/10.3390/horticulturae7070190
9. Moral, J. , M. Teresa Garcia-Lopez, Ana Gordon, Alejandro Ortega-Beltran, Ryan Puckett1, Kenji Tomari, Thomas M. Gradziel, and Themis J. Michailides. 2021., Resistance of almond cultivars grown in California to Aspergillus flavus and A. parasiticus. Plant Disease. manuscript ID is PDIS-05-21-0892.
10. Kester, D.E., K.A. Shackel, W.C. Micke, M. Viveros, and T.M. Gradziel. (2004). Noninfectious bud failure in 'Carmel' almond: I. Pattern of development in vegetative progeny trees. J. Amer. Soc. Hort. Sci. 129(2):244-249

Professional awards and honors

L.D. Davis Endowed Chair for Tree Crop Breeding

Prestigious service to the profession

- Chair, Walnut Endowment Review Committee 2017-2020.
- Chair, International Society of Horticultural Science Almond Working Group 2019-2022
- Chair, National Prunus Crop Germplasm Almond Sub- committee 2019-2022
- Co-convener International Symposium on Almond and Pistachio, Davis, originally scheduled for 2021; rescheduled to 2022; rescheduled to May, 2023.
- Rosaceae Genomics, Genetics, and Breeding Executive Committee. 2019-2022.
- Scientific Committee: 10th ISHS Peach Conference, Naoussa, Greece, 2019-2022.
- UC Liaison for UCD-Tehran University Cooperative Agreement Promoting Joint Research and Education 2019-2022.

Invited Speaker

•Four invited international/national conference presentations: International Conference on Almond and Pistachios, Adelaide, Australia, 2017; 2nd Annual Plant Science Symposium on Advancing Frontiers in Plant Sciences, Florida, 2018; PAG, 2019; NIFA Workshop Breeding for Food Safety, UCD, 2019.-Clonal crop breeding. Advancing Frontiers in Plant Sciences Symposium. Genetics Institute at the University of Florida, Gainesville, FL. 1/26/18.

- Reprogramming Post-Ripening Decay Through Exotic Gene Introgression In Peach, Phytomedomics and Nutriomics Workshop, PAG San Diego, CA, January 15, 2019.

-Invited presentations for the Canadian Phytopathological Society-May 7, ISHS Prunus Genetic Improvement webinar-May 27, the ASHS conference - Tree Nut Improvement Workshop-August 8

In-person presentations were given to the Nursery Nut Tree Improvement Board-May 13, Salida field day-June 30, ABC Rootstock Workshop-August 19, Crop Consultant Conference, Visalia-September 16, Nursery/grower Bud-failure tour, Wolfskill-October 12

-Plant patents for Hesse peach, Rizzi peach, Goodwin peach, Lilleland peach, Kader peach, Vilmos peach, Winters almond, Kester almond and Sweetheart almond.

Major awards won by your graduate students or postdocs

Shawn Overstreet. 2015. National Science Foundation Scholarship to do research in the Republic of Korea on acorns as an alternative food stock.

Exhibit A6

CURRENT & PENDING SUPPORT

University will provide current & pending support information for Key Personnel identified in Exhibit A2 at time of proposal and upon request from State agency. The "Proposed Project" is this application that is submitted to the State. Add pages as needed.

PI: NAME OF INDIVIDUAL					
Status (currently active or pending approval)	**Award # (if available)**	**Source (name of the sponsor)**	**Project Title**	**Start Date**	**End Date**
CURRENT		Almond Board of California	Rootstock breeding	January 1, 2020	December 30, 2022
CURRENT		Almond Board of California	Almond variety development	January 1, 2020	December 30, 2022
CURRENT		Almond Board of California	Accelerated testing	January 1, 2020	December 30, 2024
CURRENT		Almond Board of California	Genomics application	January 1, 2020	December 30, 2024
CURRENT		California Cling Peach Advisory Board	Variety development	July 1, 2021	June 30, 2022
CURRENT		California Cling Peach Advisory Board	Regional testing	July 1, 2021	June 30, 2022
CURRENT		USDA SCRI	Developing Armillaria resistant rootstocks	July 1, 2020	June 30, 2024
CURRENT					
CURRENT					
CURRENT					
CURRENT					
CURRENT					
PENDING					

Exhibit A7

Third Party Confidential Information

Confidential Nondisclosure Agreement

(Identified in Exhibit A, Scope of Work – will be incorporated, if applicable)

If the scope of work requires the provision of third party confidential information to either the State or the Universities, then any requirement of the third party in the use and disposition of the confidential information will be listed below. The third party may require a separate Confidential Nondisclosure Agreement (CNDA) as a requirement to use the confidential information. Any CNDA will be identified in this Exhibit A7.

NA

Exhibit B-Budget

Budget for Project Period

Exhibit 'B' (Attachment #1)

IAB - BUDGET PROPOSAL

Project Title/Description: Almond Bud-Failure Genetic Disorders

Project Leader: Tom Gradziel_____

1. **Proposed Fiscal Year: 2022-23**

A. PERSONNEL SERVICES:		
GSR/Fellowship (25%)		**14,205**
Lab/Field Assistance		**1,500**
Subtotal		**15,705**
Employee benefits	**Sub 6**	**299**
TOTAL PERSONNEL SERVICES		**$16,004**
B. OPERATING EXPENSES:		
General supplies		**6,975**
Other Grad Fees		**15,533**
10% indirect cost		**1,600**
C. TOTAL OPERATING EXPENSES:		**$40,112**
	Tot.	**$40,112**
D. TOTAL BUDGET REQUESTED (2022):		**$ 40,112**

Exhibit B1

Budget Justification

The Budget Justification will include the following items in this format.

Personnel

Name. *Starting with the Principal Investigator list the names of all known personnel who will be involved on the project for each year of the proposed project period. Include all collaborating investigators, individuals in training, technical and support staff or include as "to be determined" (TBD).*

Role on Project. *For all personnel by name, position, function, and a percentage level of effort (as appropriate), including "to-be-determined" positions.*

Graduate Student, Field Research Manager

Fringe Benefits.

In accordance with University policy, explain the costs included in the budgeted fringe benefit percentages used, which could include tuition/fee remission for qualifying personnel to the extent that such costs are provided for by University policy, to estimate the fringe benefit expenses on Exhibit B.

Standard fringe benefits for Field Research Manager Graduate Student

Travel

Itemize all travel requests separately by trip and justify in Exhibit B1, in accordance with University travel guidelines. Provide the purpose, destination, travelers (name or position/role), and duration of each trip. Include detail on airfare, lodging and mileage expenses, if applicable. Should the application include a request for travel outside of the state of California, justify the need for those out-of-state trips separately and completely.

NA

Materials and Supplies

Itemize materials supplies in separate categories. Include a complete justification of the project's need for these items. Theft sensitive equipment (under $5,000) must be justified and tracked separately in accordance with State Contracting Manual Section 7.29.

Funds are for general field (fertilizers, pesticides, irrigation supplies) and lab (tissue culture supplies and microscopy supplies).

Equipment

List each item of equipment (greater than or equal to $5,000 with a useful life of more than one year) with amount requested separately and justify each.

NA

Consultant Costs

Consultants are individuals/organizations who provide expert advisory or other services for brief or limited periods and do not provide a percentage of effort to the project or program. Consultants are not involved in the scientific or technical direction of the project as a whole. Provide the names and organizational affiliations of all consultants. Describe the services to be performed, and include the number of days of anticipated consultation, the expected rate of compensation, travel, per diem, and other related costs.

NA

Subawardee (Consortium/Subrecipient) Costs

Each participating consortium organization must submit a separate detailed budget for every year in the project period in Exhibit B2 Subcontracts. Include a complete justification for the need for any subawardee listed in the application.

NA

Other Direct Costs

Itemize any other expenses by category and cost. Specifically justify costs that may typically be treated as indirect costs. For example, if insurance, telecommunication, or IT costs are charged as a direct expense, explain reason and methodology.

Graduate Student Tuition and Fees

Rent

If the scope of work will be performed in an off-campus facility rented from a third party for a specific project or projects, then rent may be charged as a direct expense to the award.

NA

Indirect (F&A) Costs

Indirect costs are calculated in accordance with the University budgeted indirect cost rate in Exhibit B.

10% indirect costs on salary and benefits per the agency

Exhibit B2

Budget Pertaining to Subawardee(s) (when applicable)

NA

Exhibit B3-Invoice Elements

Invoice and Detailed Transaction Ledger Elements

In accordance with Section 14 of Exhibit C – Payment and Invoicing, the invoice, summary report and/or transaction/payroll ledger shall be certified by the University's Financial Contact and the PI (or their respective designees).

Invoicing frequency

__Quarterly __ Monthly

Invoicing signature format

__ Ink __Facsimile/Electronic Approval

Summary Invoice – includes either on the invoice or in a separate summary document – by approved budget category (Exhibit B) – expenditures for the invoice period, approved budget, cumulative expenditures and budget balance available[1]

- Personnel
- Equipment
- Travel
- Subawardee – Consultants
- Subawardee – Subcontract/Subrecipients
- Materials & Supplies
- Other Direct Costs
    - TOTAL DIRECT COSTS (if available from system)
- Indirect Costs
    - TOTAL

Detailed transaction ledger and/or payroll ledger for the invoice period [2]

- Univ Fund OR Agency Award # (to connect to invoice summary)
- Invoice/Report Period (matching invoice summary)
- GL Account/Object Code
- Doc Type (or subledger reference)
- Transaction Reference#
- Transaction Description, Vendor and/or Employee Name
- Transaction Posting Date
- Time Worked
- Transaction Amount

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[1] If this information is not on the invoice or summary attachment, it may be included in a detailed transaction ledger.

[2] For salaries and wages, these elements are anticipated to be included in the detailed transaction ledger. If all elements are not contained in the transaction ledger, then a separate payroll ledger may be provided with the required elements.

Exhibit C-University Terms and Conditions

CMA (AB20) State/University Model Agreement Terms & Conditions UTC-220

Exhibit D-Additional Requirements Associated with Funding Sources

(if applicable)

If the Agreement is subject to any additional requirements imposed on the funding State agency by applicable law (including, but not limited to, bond, proposition and federal funding), then these additional requirements will be set forth in Exhibit D. If the University is a subrecipient, as defined in 2 CFR 200 (Uniform Guidance on Administrative Requirements, Audit Requirements and Cost Principles for Federal Financial Assistance), and the external funding entity is the federal government, the name of the federal agency, the prime award number and date of prime award (if available), and the Catalog of Federal Domestic Assistance (CFDA) program number will be listed in Exhibit D. (Please see sections 10.A and 10.B of the Exhibit C.)

NA – Not federally funded.

Exhibit E Special Conditions for Security of Confidential Information

(if applicable)

If the of work or project results in additional legal and regulatory requirements regarding security of Confidential Information, those requirements regarding the use and disposition of the information, will be provided by the funding State agency in Exhibit E. (Please see section 8.E of Exhibit C.)

NA

Exhibit F (if applicable)

Access to State Facilities or Computing Systems
Agency Requirements/Agreement

If the scope of work or project requires that the Universities have access to State agency facilities or computing systems and a separate agreement between the individual accessing the facility or system and the State agency is necessary, then the requirement for the agreement and the agreement itself will be listed in Exhibit F. (Please see section 20 of Exhibit C.)

NA

Exhibit G – Negotiated Alternate UTC Terms (if applicable)

An alternate provision in Exhibit G must clearly identify whether it is replacing, deleting or modifying a provision of Exhibit C. The Order of Precedence incorporated in Exhibit C clearly identifies that the provisions on Exhibit G take precedence over those in Exhibit C.

*While every effort has been made to keep the UTC as universal in its application as possible, there may be unique projects where a given term in the UTC may be inappropriate or inadequate. AB20 allows for those terms to be changed, but only through the mutual agreement and negotiation of the State agency and the University campus. If a given term in the UTC is to be changed, the change should **not** be noted in Exhibit C, but rather noted separately in Exhibit G.*

NA